The present invention is directed towards a polymer composition made by a continuous polymerization process in which a parameter of the process is varied by increasing and decreasing the parameter in a recurring pattern during the polymerization process. Examples of parameters that may be varied in the continuous polymerization process selected from the group consisting of a polymerizable monomer of part a) of claim 1, the percentage of the unsaturated monomer of part b) of claim 1, amount of catalyst used in the polymerizable process; amount of molecular weight modifier used in the polymerizable process; the pH value of the monomer during the process; the degree of neutralization of the monomer solution during the polymerizable process; and graft basis of the polymer. The advantages of varying a parameter are shown in the examples of the present invention.

The Office Action rejected claims 1-3, 5-15 and 17-24 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 3, 13, 15, and 20-24 have been amended to overcome these rejections.

The Office Action rejected pending claims 1 and 6-12 under 35 U.S.C. § 102(b) as being anticipated by Dahmen et al. (USP 5,712,316). The Examiner opines that Dahmen et al. discloses powder formed crosslinked polymers for absorbing aqueous liquids using the process set forth in Dahmen et al. column 6 lines 7-10. The Examiner concludes the continuous polymerization process conditions for producing the same composition in Dahmen et al. would be inherent to the applicants' claimed compositions.

Dahmen et al. does not teach or suggest one would vary a parameter by increasing and decreasing the parameter in a recurring pattern during the process. The Examiners attention is directed to the examples 1 and 2 in the present application and the increased

permeability gained by varying the metering rate of polyethylene glycol from 5kg/h to 15kg/h and with a steady decrease to 5kg/h over a time period of 60 minutes. This is not taught or suggested in Dahmen et al., which only discloses a general way of producing an absorbent polymer which is mainly based on partially neutralized acrylic acid and wherein the internally crosslinked absorbent polymer is surface crosslinked in a second step. This becomes, in particular, clear in comparative examples 1 and 2 in column 7 of Dahmen et al.

In view of the present invention, the object which can be derived from the teaching of Dahmen et al. was to improve the absorbency properties, in particular the absorption under load (AUL) of water absorbing polymers. According to Dahmen et al. this object was solved by using a blowing agent that yields a microporous structure in the water absorbing polymers. To the contrary of Dahmen et al., the present invention solves this object by varying at least one parameter during the polymerization according to a recurring pattern.

The AUL is a parameter that assesses the absorption capability of a water absorbing polymer when pressure is applied on the water-absorbing polymer while the polymer is formed due to the absorption of water or of a saline solution. This application of pressure simulates a pressure that occurs on the water-absorbing polymer when incorporated in a core of a diaper and an infant sitting on the diaper. It is highly appreciated with regard to the overall absorbent performance of a diaper when the water-absorbing polymer exhibits a high AUL value even under high pressures. For example, a high AUL reduces the probability of leaking from the diaper.

The comparison of the AUL values under higher pressure of table 1, column 7 in Dahmen et al. with the high-pressure AUL values of the tables on page 23 and 25 of

the present application shows that the present invention exhibits significantly higher AUL values compared to table 1 of Dahmen et al. The AUL values with a load of 40g/cm^2 in table 1 of Dahmen et al are 15g/g as well as 9g/g. In contrast to this the AUL values under a load of 50g/cm^2 in the present application are 24, 23.5, 26 or 23, respectively. Accordingly, the AUL values of the present invention even under a higher load compared to the load applied in Dahmen et al. are at least a factor of 2 higher than the AUL values of Dahmen et al. which were measured under a lower load.

This is a result that proves an affect being unexpected for the person skilled in the art since there is neither teaching nor suggestion in Dahmen et al. Moreover, Dahmen et al. teaches away from the technical teaching used in the present invention in order to solve the object course. Dahmen et al. does not disclose or suggest varying a parameter but teaches to use a blowing agent in order to solve the above-discussed object.

The above argumentation is supported by the comparison of examples 1 and 2 with comparative example of the present application. The AUL value with a load of 50g/cm^2 of 24, 23.5, 26 or 23, respectively, is all most equal or significantly higher than the AUL of 23.5 of the water absorbing polymer in accordance to comparative example 1 as shown in the table on page 26 of the specification of the present application. Moreover, the table on page 26 of the specification of the present application clearly shows that besides the all most equal AUL the water absorbing polymer in accordance to the present invention exhibits a significantly higher gel permeability (GP). The gel permeability is also a desired feature for the overall performance of a water-absorbing polymer incorporated in a core of a diaper. The measurement of the gel permeability is an indicator for the occurrence of gel blocking. The

higher the GP the less is the tendency of the water absorbing polymer to show gel blocking when contacted with water or a saline solution.

In summary, the present invention shows various unexpected effects over the teaching of Dahmen et al. Therefore, the subject matter of the currently pending claims of the present invention is not obvious and does involve inventive step.

The Office Action rejected all the pending claims 1-24 under 35 U.S.C. § 103(a) as being unpatentable over Dahmen et al. (USP 5,712,316). The Examiner states that Dahmen et al. disclose the claimed invention as discussed above under the 102 rejection. As stated above, Dahmen et al. fails to disclose varying the defined parameters during the polymerization process as required in the present claims. Dahmen et al. fails to teach or disclose to vary a parameter by increasing and decreasing the parameter in a recurring pattern where in a parameter may be a polymerizable monomer of part a), the percentage of the unsaturated monomer of part b), amount of catalyst used in the polymerizable process; amount of molecular weight modifier used in the polymerizable process; the pH value; degree of neutralization of the monomer solution during the polymerizable process; and graft basis of the polymer.

The Office Action rejected all the pending claims 1-24 under 35 U.S.C. § 103(a) as being unpatentable over Dahmen et al. (USP 5,712,316) in view of Yada et al. (US Patent 4,690,788). The Examiner relies on Dahmen et al. as stated above. In addition the Examiner states that Yada et al. discloses a continuous process for producing particles of polymer gel prepared by polymerizing an aqueous solution of water-soluble vinyl monomers onto a moving support and concludes it would have been obvious to one of ordinary skill in the art to use a polymer gel in Dahmen et al. which can be manufactured on the moving support

suggested by Yada et al. Combining Dahmen et al. and Yada et al. fail to disclose varying the defined parameters during the polymerization process as required in the present claims.

In view of the foregoing remarks, this case is in condition for allowance and such action is respectfully requested. If any issues remain unresolved, applicant would welcome the opportunity for a telephone interview to expedite allowance and issue.

Respectfully submitted,

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Marked-Up Version Showing Changes

In the Claims:

1. (Twice Amended) A p~~P~~owdered, crosslinked polymer compositions for absorbing aqueous or serous fluids, as well as blood, comprising:

a) 55 - 99.9 wt.-% of at least one polymerized, ethylenically unsaturated, polymerizable monomer which contains acid groups neutralized to at least 25 mole-%;

b) 0 - 40 wt.-% of polymerized, unsaturated monomers copolymerizable with a);

c) 0.01 - 5.0 wt.-% of one or more crosslinking agents;

d) 0 - 30 wt.-% of a water-soluble polymer, the weight amounts a) through d) being based on anhydrous polymer composition, and the sum of these components always being 100 wt. -%, ~~which~~wherein the powdered crosslinked polymer compositions is made ~~can be obtained~~ by continuous polymerization process wherein ~~at least one~~ a parameter of the continuous polymerization process is varied by increasing and decreasing the parameter in a recurring pattern, during the polymerization process.~~biasing the polymerization is varied according to a recurring pattern.~~

3. (Amended) The polymer compositions ~~according to~~of claim 2, ~~characterized in that~~wherein the oscillation is selected from the group consisting of harmonic or anharmonic.~~ and preferably undamped~~.

13. (Amended) A process for the continuous production of powdered, crosslinked polymer compositions absorbing aqueous or serous fluids, as well as blood, comprising:

a) 55 - 99.9 wt.-% of at least one polymerized, ethylenically unsaturated, polymerizable monomer which contains acid groups neutralized to at least 25 mole-%;

b) 0 - 40 wt.-% of polymerized, unsaturated monomers copolymerizable with a);

c) 0.01 - 5.0 wt.-% of one or more crosslinking agents;

d) 0 - 30 wt.-% of a water-soluble polymer, the weight amounts a) through d) being based on anhydrous polymer composition, and the sum of these components always being 100 wt-%, wherein the powdered crosslinked polymer composition is made by continuous polymerization process wherein a parameter of the continuous polymerization process is varied by increasing and decreasing the parameter in a recurring pattern, during the polymerization process.

~~. %, the monomer solution being polymerized to form a gel, said gel being dried and crushed, characterized in that at least one parameter biasing the polymerization is varied according to a recurring pattern~~.

15. (Amended) The process ~~according to~~of claim 13, ~~characterized in that~~wherein the oscillation is selected from the group consisting of harmonic or anharmonic. ~~and preferably undamped~~

20. (Twice Amended) An absorbent material for water and aqueous liquids comprising a ~~Use of the~~ polymer composition of claim 1 ~~as an absorbent for water and aqueous liquids~~.

21. (Twice Amended) An material comprising an absorbent to absorb body fluids comprising a ~~Use of the~~ polymer composition ~~according to~~ of claim 1 ~~as an absorbent in constructions used to absorb body fluids~~.

22. (Twice Amended) A electroconductive or light conducting cable comprising a ~~Use of the~~ polymer composition ~~according to~~of claim 1 ~~as a component in electroconductive or light conducting cables which absorbs water and aqueous liquids, as a component in packaging materials, as soil improver, and in plant breeding.~~

23. (Twice Amended) A foamed sheet material comprising ~~Use of the~~ polymer composition ~~according to~~ of claim 1 ~~as an absorbent for water and aqueous liquids in preferably foamed sheet materials~~.

24. (Twice Amended) ~~Use of the polymer composition according to claim 1 as~~ Aa vehicle for fertilizers or other active ingredients released over a prolonged period of time comprising a polymer composition of claim 1.